Summary of the Invention

A power saving mobility context aware computer system and method is provided. Said context aware computer system is a computer system that contains at least one process unit and at least one mobility context receiving device (MCRD) that is able to detect a mobility context. Said mobility context includes the location context and proximity context. Said location context is related to an absolution position in a referencing position system. Said proximity context is related to the relative position between objects. A link is provided between said processor and said MCRD to provide means for accessing to a memory in said MCRD. A context aware application that is performed by said process unit selects one or more special conditions of said mobility context (hereafter "trigger condition") and associates one or more tasks to each of trigger conditions. Said application then store said trigger conditions in said memory of said MCRD through said link. Said MCRD is able to detect said mobility context change and signal said application when current state of said mobility context meets the trigger conditions. After receiving said signal, said context aware application performs said one or more tasks that associated with said trigger conditions. Separating context detecting from said application reduces a lot of power consumption and activities on said process unit. To further reduce the power consumption, said process unit may enter a power saving mode if no activity is on said process unit. While powering down said process unit, said MCRD is still active and draws very little of electricity from power supply, such as battery, to perform context detecting. Before said MCRD signals said process

LOCATION AWARE MCRD

FIG. 2 illustrates a preferred embodiment of the present invention that aware of location context. Said embodiment includes of a host system and a location aware MCRD. Said MCRD connected to host system through a link, which is an I/O bus. Said MCRD 0200 includes of a GPS signal processor 0201, a checker 0202, an interface controller 0203, and a memory 0204. Said signal processor received signals from multiple satellites and determines its position by triangulation. A position is usually composed of longitude, latitude, and altitude. A context aware application 0108 on said host system 0120 receives one or more jobs and a trigger area for each of said jobs from user or other application. Said application 0108 then instructs said interface controller 0203 through said bus to store said trigger areas in said memory 0204. Said signal processor 0201 continuously or periodically calculates and updates the current position. Said checker 0202 then compares said current position with said trigger areas in said memory 0204. When said current position falls in any of said trigger areas in said memory 0204, said checker 0202 generates a trigger signal to notify said application 0108. Said MCRD 0200 and the host system 0120 can enter power saving mode independently. Said power saving mode means to power down or enter sleep mode with low or no activities. To reduce power consumption, said host system 0120 might enter power saving mode when it has no activity. Before notifying said application 0108, trigger signal might first wake up host system 0120 if host system is in power saving mode. Said application 0108 might register an interrupt service on said host system 0120. Host system 0120 executes said interrupt service when receives said trigger signal. Said interrupt service retrieves triggered trigger areas and pass to said application 0108. In

signal and down convert into lower frequency analogy signal and pass it to baseband processor 0306. Said baseband processor 0306 demodulates said analogy signal into physical layer data frame, then decodes and passes a MAC frame in said physical layer data frame to MAC controller 0307. To distinguish all WCI and control their access right to a wireless media, each WCI is given an identifier. Said identifier is a MAC address in MAC sub layer protocol. The format of said MAC frame includes a header field and other data fields. A MAC frame header may includes one or more identifier fields, such as receiver address, transmitter address, source address, destination address, or BSSID, etc. The BSSID is the MAC address of an access point. Said MAC controller 0307 decodes said MAC frame, and passes the data unit of said MAC frame to other protocol layer if the destination or receiver address is addressed to WCI 0301 or a group address addresses that includes WCI 0301. Because of limited operation range, the WCI 0301 can only receive data that transmit on wireless media by other WCI in proximity. Since that, said transmitter address of said MAC frame discloses the identifier of another WCI in proximity. The receiver address further suggests yet another WCI that is designated by said transmitter address is also close to the WCI 0301. The BSSID also suggests an access point in proximity. These MAC address fields of said MAC frame are the context interested to said context aware application 0108, and a trigger state of said context refers to one or more of said MAC addresses of other WCI that application wish to detect. Said application 0108 on said host system 0120 receives a request for executing a job and its trigger condition from user or other application. Said trigger condition is a presence rule of other WCIs. A simple presence rule might includes one identifier of other WCI. A more complicated presence rule might be an equation, such as Boolean equation, of

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CLAIMS

I claim:

1. A method for a computing device to discover mobility context and response to said mobility context, the method comprising:

receiving a job and the trigger condition of said job, wherein said trigger condition define a trigger state in said mobility context;

storing said trigger state in memory of a mobility context receiving device (MCRD), wherein said MCRD is capable of receiving current state of said mobility context;

receiving current state of said mobility context;

checking said current state with said trigger state in memory of said MCRD;

outputing a signal if said current state is subset of said trigger state; and

executing said job by said application on a host system after receiving said signal.

2. The method of claim 1, further comprising:

putting said host system into power saving mode if said host system has no or very low activity; and

waking up said host system after receiving said signal.

3. The method of claim 1, wherein said mobility context is selected from the following group consisting of location context and proximity context.

4. The method of claim 4, wherein said location context is the current position in said system in a referencing position system.

5. The method of claim 4, wherein said referencing position system is Global Positioning System (GPS) referencing position system.

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6. The method of claim 4, wherein said proximity context is the presence of other wireless communication interface.

7. The method of claim 6, wherein said wireless communication interface complies with the protocol selected from the following group consisting of IEEE 802.11a/b/c/g, BlueTooth Technology, GSM, CDMA, GPRS, RFID, IrData, and UWB.

8. A computer system to discover mobility context and response to said mobility context comprising:

at least one processor;

at least one mobility context receiving device (MCRD), wherein said MCRD is capable of receiving the current state of said mobility context;

at least one job;

a trigger condition associate with said job;

a memory in said MCRD for storing said trigger condition; and

a checker in said MCRD outputs a signal when said current state meet the criteria of said trigger condition in said memory; and

an context aware application execute said job on said processor after receiving said signal;

9. The system of claim 8, further comprising a power saving device that puts said processor into power saving mode if said process has no or very low activity and wakes up said processor after received said signal from MCRD.

10. The method of claim 8, wherein said mobility context is selected from the following group consisting of location context and proximity context.

11. The method of claim 10, wherein said location context is the current position in said system in a referencing position system.

12. The method of claim 11, wherein said referencing position system is Global Positioning System (GPS) referencing position system.

13. The method of claim 10, wherein said proximity context is the presence of other wireless communication interface.

14. The method of claim 13, wherein said wireless communication interface complies with the protocol selected from the following group consisting of IEEE 802.11a/b/c/g, BlueTooth Technology, GSM, CDMA, GPRS, RFID, IrData, and UWB.

15. A mobility context receiving device that aware of proximity context comprising:

a wireless communication interface through which a raw data bit stream received from other wireless communication interface;

a processor that encoded and decode said raw bit stream;

at least one received identifier that decoded from received said raw bit stream and unique identify other wireless communication interface;

at least one memory in which one or more trigger condition are stored, wherein said trigger condition define a presence rule of one or more identifiers of other wireless communication interfaces;

a checker that generates a signal when said received identifier meet the criteria of said trigger condition; and

a interface controller through which said trigger condition can be store into said memory and information of triggered trigger condition can be retrieve.

16. The device of claim 15, wherein said wireless communication interface further includes:

a wireless media receiver;

a baseband processor; and

a media access control (MAC) controller.

17. The device of claim 16, wherein said proximity context is the presence MAC address of other wireless interface in received MAC frame.

18. The device of claim 15, wherein said interface controller send out wake up instruction to a host system..

19. The device of claim 15, wherein said processor implement with one or more communication protocol stack.

20. The device of claim 19, wherein said protocol stack is an IP protocol.

21. A mobility context receiving device that aware of location context comprising:

a receiver for receiving positioning signal;

a signal processor that calculates the current position of said device from said positioning signal;

at least one memory in which one or more trigger area specification can be stored;

a checker that generates a trigger signal when said current position falls inside said trigger area; and

a interface controller through which said trigger area specification can be stored in said memory and information of triggered trigger area can be retrieve.

22. The device of claim 16, wherein said interface controller send out wake up instruction to a host system.

23. The method of claim 1, further comprising:

giving a call back identifier to associate with said job and said trigger state;

storing said callback identifier to said memory; and

sending said callback identifier to said application if said current state is subset of said trigger state, wherein said application can execute said job by referring to said callback identifier.